

# APPLICATION NOTE



## Final line dryers validation

Mabe performs the continuous and online inspection of stacked laundry centers using the custom software **bcbMonitor**® based on IR FLIR technology.

As part of the strict quality controls and functional tests carried out in the final line, the verification of the exhaust unit is essential for the approval of the equipment. The temperature increase from start to stop must be kept within the correct range and this check must be simultaneous to the others that are made, also of easy execution for the operator.

With the thermography quality test using FLIR thermal imagers and **bcbMulticam** analysis software, carried out remotely and without contact, the temperature of the exhaust can be continuously verified by recording thermal delta, date and time data of each product in the stage end of the line.

Since its creation in 1946, Mabe has taken the quality of its products very seriously, which is why it is recognized as the world leader in home appliances. Their stacked laundry centers were designed and thought for the highest care of clothes, so maintaining the quality and ensuring the proper functioning of each of its components is primordial. The test lines that its plants have are very complete and modern as well as having a high level of automation.

Exhaust: relevance and inspection

The combustion chamber is a crucial component of the drying unit, whose correct operation is known by inspecting the exhaust temperature.

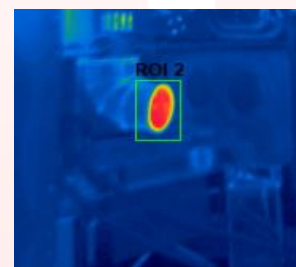
Thermography turned out to be the ideal technology for this inspection, since it is carried out at a distance and with high precision. The sensors for online monitoring, such as the Ax8 camera, also guarantee the automatic and unattended execution of the test, simultaneous to the others that are executed.



FLIR AX8 combines thermal images with visual cameras for monitoring and continuous temperature alarm



Washing center seen on the back face, the exhaust is located in the middle part.



Thermal image during test in exhaust where a ROI has been created (Region of interest)

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## Thermographic visualization

The Mabe Saltillo plant has 4 test lines for washing centers, each equipped with an Ax8 thermal imaging camera. The thermographic image of the rear area of the unit is obtained and therefore the measurement of the exhaust. The resolution of 80x60 pixels is equivalent to the use of 4,800 thermocouples whose average offers a very accurate reading. The sensitivity of the camera allows detecting temperature changes up to 0.1 °C at a speed of 9 Hz, enough to obtain readings every second of the test.

## Test procedure

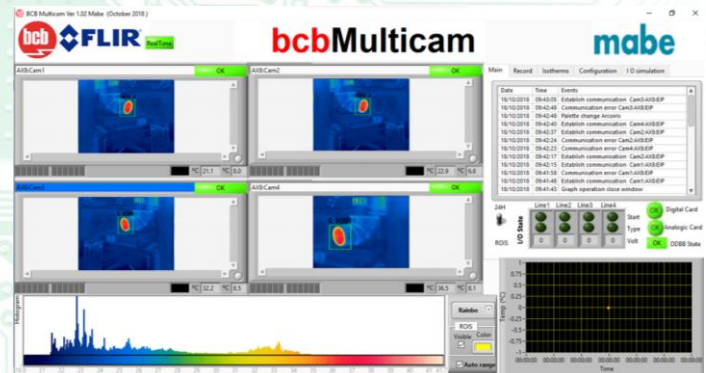
The operator starts the tests with the connection of the unit and its ignition, the latter being the signal taken by the tester as the start of the test and transmitted to the **bcB**Multicam. From that moment, thermographic images are acquired every second until the unit is switched off. A delta of the registered temperatures is made and within the defined range the unit is approved / rejected, storing the results in the Mabe database.



Mabe Saltillo, which operates since 1989, produces 2.2 million units per year, of which 65% are destined for export

## Software

Although the realization and storage of the test and its results are designed, the **bcB**Multicam gives the possibility of having the visualization of each of the cameras in real time also allows the generation of ROIs (Region of interest) in addition to the real-time display of the histogram of each of the images showing temperature values over time.



Graphical interface of **bcB**Multicam, according to the test procedures designed by Mabe.

### **bcB**

Fernando el Católico 11  
28015 Madrid  
Tel. (+34) 91 758 0050

[info@bcB.es](mailto:info@bcB.es)

[www.bcBingenieria.com](http://www.bcBingenieria.com)

### **bcB México**

Homero 538-303  
Polanco V sección  
Del. Miguel Hidalgo  
11560 Ciudad de México  
Tel. (+52) 55 9183 0547 Ext. 7547  
Sucursal Monterrey Tel. (+52) 81 1041 2616

[info@bcBmex.com](mailto:info@bcBmex.com)

[www.bcBingenieria.com](http://www.bcBingenieria.com)

